PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2018
(Fourth Semester)

Branch –**SOFTWARE SYSTEMS**
(Five year integrated)

OPERATIONS RESEARCH

Time: Three Hours Maximum: 75 Marks

Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 15 = 75)

1 a Explain the standard form of Linear programming problem.

b Solve the LPP by using graphical method :
Max $z = 5x + 7y$
Subject to the constraints $12x + 12y \leq 840$; $3x + 6y \leq 300$; $8x + 4y \leq 480$ and $x, y \geq 0$.

OR

c State the formulation of linear programming problem.

d Solve the LPP using simplex method :
Maximize $z = 6x_1 + 4x_2$ subject to constraints $2x_1 + x_2 \leq 390$; $3x_1 + 3x_2 \leq 810$; $x_2 \leq 200$ and $x_1, x_2 \geq 0$.

2 a State the algorithm of North-west corner rule for finding initial basic feasible solution of a transportation problem.

b Obtain an initial basic feasible solution to the following transportation problem using the Matrix Minima method :

	D_1	D_2	D_3	D_4	Supply
O_1	1	2	3	4	6
O_2	4	3	2	0	8
O_3	0	2	2	1	10
Demand	4	6	8	6	

OR

c A project work consists of four major jobs for which four major contractors have submitted tenders. The tender documents quoted in thousand rupees are given below with the cost matrix as

		Jobs			
		J_1	J_2	J_3	J_4
Contractors	C_1	15	27	35	20
	C_2	21	29	33	17
	C_3	17	25	37	15
	C_4	14	31	39	21

Find the assignment which minimizes the total of the project cost. Each contractor has to be assigned one job.

d Define the term set-up cost and holding cost as applied to an inventory problem.

3 a What are the situations which make the replacement of item necessary?

Cont...

b A truck owner finds from his past records that the maintenance cost per year of a truck whose purchase price is Rs. 8,000 are as given below :

Year :	1	2	3	4	5	6	7	8
Maintenance Cost :	1000	1300	1700	2200	2900	3800	4800	6000
Resale price :	4000	2000	1200	600	500	400	400	400

Determine at which time it is profitable to replace the truck.

OR

c State some of the simple replacement policies.

d What is 'group replacement'? Give an example.

4 a Describe a two-person zero-sum game.

b Solve the game whose pay-off matrix is given by :

$$\begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \end{array} \begin{array}{c} \begin{array}{ccc} B_1 & B_2 & B_3 \end{array} \\ \begin{bmatrix} 1 & 3 & 1 \\ 0 & -4 & -3 \\ 1 & 5 & -1 \end{bmatrix} \end{array}$$

OR

c Explain the following term
(i) queue length and (ii) traffic intensity

d A petrol pump station has two pumps. The service times follows exponential distribution with a mean of 4 minutes and cars arrive for service in a Poisson process at the rate of ten cars per hour. Find the probability that a customer has to wait for service. What proportion of time the pumps remain idle?

5 a State the iterative procedure of determining the critical path in CPM.

b The following table gives the activities of a construction project and duration :

Activity :	1-2	1-3	2-3	2-4	3-4	4-5
Duration (Days) :	20	25	10	12	6	10

(i) Draw the network for the project and
(ii) Find the critical path.

OR

c State the PERT algorithm.

d Explain (i) Pessimistic time (ii) Optimistic time and (iii) Most likely time.

Z-Z-Z END